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PATENT  
Atty. Dkt. No. SDUC1120-1  
(041673-3202)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: Virgil L. Woods, Jr.

Title: METHODS FOR  
CRYSTALLOGRAPHIC  
STRUCTURE DETERMINATION  
EMPLOYING HYDROGEN  
EXCHANGE ANALYSIS

Appl. No.: 10/688,193

Filing Date: October 17, 2003

Examiner: Unknown

Art Unit: 2857

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Mail Stop Amendment  
Commissioner for Patents  
PO Box 1450  
Alexandria, VA 22313 1450

**IDS TRANSMITTAL**

Sir:

Transmitted herewith for the above-identified application please find:

- (1) Information Disclosure Statement
- (2) Completed Form PTO/SB/08
- (3) Copies of the cited references
- (4) Return Receipt Postcard

In re Application of:  
Virgil L. Woods, Jr.  
Application No.: 10/688,193  
Page 2

PATENT  
Atty. Dkt. No.: 041673-3202  
(041673-3202)

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 CFR §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 50-0872. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 50-0872.

Respectfully submitted,

Date

8/17/04

By

SEP EL

Stephen E. Reiter  
Attorney for Applicant  
Registration No. 31,192

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**INFORMATION DISCLOSURE STATEMENT**  
**UNDER 37 CFR §1.56**

Mail Stop Amendment  
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P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Submitted herewith on Form PTO/SB/08 is a listing of documents known to Applicant in order to comply with Applicant's duty of disclosure pursuant to 37 CFR §1.56. A copy of each listed document, except as noted below, is being submitted to comply with the provisions of 37 CFR §1.97 and §1.98.

The USPTO has waived the requirement under 37 CFR 1.98(a)(2)(i) to submit copies of U.S. patents and U.S. patent application publications when citing and submitting an Information Disclosure Statement in a patent application filed after June 30, 2003, and in an international application that has entered the national stage under 37 USC §371 after June 30, 2003. Accordingly, copies of these types of documents are not being supplied in connection with this

application. Reference is being made to Pre-OG Notice from Office of Patent Legal Administration dated July 25, 2003, *Information Disclosure Statements May Be Filed Without Copies of U.S. Patents and Published Applications in Patent Applications filed after June 30, 2003*.

The submission of any document herewith, which is not a statutory bar, is not intended as an admission that such document constitutes prior art against the claims of the present application or that such document is considered material to patentability as defined in 37 CFR §1.56(b). Applicant does not waive any rights to take any action which would be appropriate to antedate or otherwise remove as a competent reference any document which is determined to be a *prima facie* art reference against the claims of the present application.

#### **TIMING OF THE DISCLOSURE**

The listed documents are being submitted in compliance with 37 CFR §1.97(b), before the mailing date of the first Office Action on the merits.

#### **RELEVANCE OF EACH DOCUMENT**

All of the documents are in English.

Applicant respectfully requests that any listed document be considered by the Examiner and be made of record in the present application and that an initialed copy of Form PTO/SB/08 be returned in accordance with MPEP §609.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 CFR §§ 1.16-1.17, or credit any overpayment, to

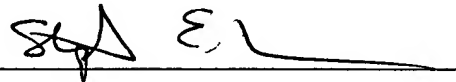
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Respectfully submitted,

Date

8/17/09

By



FOLEY & LARDNER LLP  
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Attorney for Applicant  
Registration No. 31,192

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Substitute for form 1449B/PTO

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Use as many sheets as necessary)

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of

7

## Complete if Known

Application Number	10/688.193
Filing Date	10/17/2003
First Named Inventor	Virgil L. Woods, Jr.
Group Art Unit	2857
Examiner Name	Unknown
Attorney Docket Number	041673-3202

## U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code <sup>2</sup> (if known)			
	A1	5,658,739		Woods Jr.	08-19-1997	
	A2	6,291,189		Woods Jr.	09-18-2001	
	A3	6,331,400		Woods Jr.	12-18-2001	

## FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document			Name of Patentee or Applicant of Cited Documents	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>6</sup>
		Office <sup>3</sup>	Number <sup>4</sup>	Kind Code <sup>5</sup> (if known)				

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	A4	BAI <i>et al.</i> , "Thermodynamic Parameters from Hydrogen Exchange Measurements," <i>Meth. Enzymol.</i> 259:344-356 (1995)	
	A5	BAI <i>et al.</i> , "Primary Structure Effects on Peptide Group Hydrogen Exchange," <i>Proteins: Struct. Funct. Genet.</i> 17:75-86 (1993)	
	A6	BENJAMIN <i>et al.</i> , "Long-Range Changes in a Protein Antigen Due to Antigen-Antibody Interaction," <i>Biochemistry</i> , 31:9539-9545 (1992)	
	A7	CHI <i>et al.</i> , "Use of Deuterium-Hydrogen Exchange to Characterize the Fragmentation Pathways of Arteether and its Metabolites in a Thermospray Mass Spectrometer," <i>Org. Mass Spectrometry</i> 7:58-62 (1993)	

Examiner  
Signature

Date  
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Sheet	2	of	7	Attorney Docket Number	041673-3202

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	A8	CONNELLY <i>et al.</i> , "Isotope Effects in Peptide Group Hydrogen Exchange," <i>Proteins: Struct. Funct. Genet.</i> 17:87-92 (1993)		
	A9	DENG and SMITH, "Identification of Unfolding Domains in Large Proteins by Their Unfolding Rates," <i>Biochemistry</i> 37:6256-6262 (1998)		
	A10	DHARMASIRI and SMITH, "Mass Spectrometric Determination of Isotopic Exchange Rates of Amide Hydrogens Located on the Surfaces of Proteins," <i>Anal. Chem.</i> 68:2340-2344 (1996)		
	A11	ENGEL and SMITH, "A Powerful New Approach That Goes Beyond Deciphering Protein Structures," <i>Anal. Chem.</i> 73:256A-265A (2001)		
	A12	ENGLANDER and ENGLANDER, "Structure and Energy Change in Hemoglobin by Hydrogen Exchange Labeling," <i>Meth. Enzymol.</i> 232:26-42 (1994)		
	A13	ENGLANDER <i>et al.</i> , "Protein Hydrogen Exchange Studied by the Fragment Separation Method," <i>Anal. Biochem.</i> 147:234-244 (1985)		
	A14	ENGLANDER <i>et al.</i> , "Individual Breathing Reactions Measured in Hemoglobin by Hydrogen Exchange Methods," <i>Biophys. J.</i> 10:577-589 (1979)		
	A15	ENGLANDER and POULSEN, "Hydrogen-Tritium Exchange of the Random Chain Polypeptide," <i>Biopolymers</i> 7:379-393 (1969)		
	A16	ENGLANDER and ROLFE, "Hydrogen Exchange Studies of Respiratory Proteins," <i>J. Biol. Chem.</i> 248:4852-4861 (1973)		

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	A17	ENGLANDER and ENGLANDER, "Hydrogen-Tritium Exchange," <i>Meth. Enzymol.</i> 26:406-413 (1972)		
	A18	ENGLANDER <i>et al.</i> , "Hydrogen-Tritium Exchange," <i>Meth. Enzymol.</i> 49:24-39 (1978)		
	A19	ENGLANDER <i>et al.</i> , "Protein Structure Change Studied by Hydrogen-Deuterium Exchange, Functional Labeling, and Mass Spectrometry," <i>Proc. Natl. Acad. Sci. USA</i> 100:7057-7062 (2003)		
	A20	ENGLANDER <i>et al.</i> , "Hydrogen Exchange: The Modern Legacy of Linderstrom-Lang," <i>Protein Sci.</i> 6:1101-1109 (1997)		
	A21	ENGLANDER and ENGLANDER, "Hydrogen-Tritium Exchange Survey of Allosteric Effects in Hemoglobin," <i>Biochemistry</i> 26:1846-1850 (1987)		
	A22	FESIK <i>et al.</i> "Amide Proton Exchange Rates of a Bound Pepsin Inhibitor Determined by Isotope-Edited Proton NMR Experiments," <i>Biochem. Biophys. Res. Commun.</i> 147:892-898, (1987)		
	A23	HAMURO <i>et al.</i> , "Domain Organization of D-AKAP2 Revealed by Enhanced Deuterium Exchange-Mass Spectrometry (DXMS)," <i>J. Mol. Biol.</i> , 321: 703-714 (2002)		

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	A24	HAMURO <i>et al.</i> , "Phosphorylation Driven Motions in the COOH-Terminal Src Kinase, Csk, Revealed Through Enhanced Hydrogen-Deuterium Exchange and Mass Spectrometry," <i>J. Mol. Biol.</i> 323:871-881 (2002)		
	A25	HAMURO <i>et al.</i> , "Dynamics of cAPK Type II $\beta$ Activation Revealed by Enhanced Amide H/ <sup>2</sup> H Exchange Mass Spectrometry (DXMS)," <i>J. Mol. Biol.</i> 327:1065-1076 (2003)		
	A26	HOOFNAGLE <i>et al.</i> , "Changes in Protein Conformational Mobility Upon Activation of Extracellular Regulated Protein Kinase-2 as Detected by Hydrogen Exchange," <i>Proc. Natl. Acad. Sci. USA</i> 98:956-961 (2001)		
	A27	KATTA and CHAIT, "Hydrogen/Deuterium Exchange Electrospray Ionization Mass Spectrometry: A Method of Probing Protein Conformational Changes in Solution," <i>J. Am. Chem. Soc.</i> 115:6317-6321 (1993)		
	A28	KIM and BALDWIN, "Influence of Charge on the Rate of Amide Proton Exchange," <i>Biochemistry</i> 21:1-5 (1982)		
	A29	LOUIE <i>et al.</i> , "Salt, Phosphate and the Bohr Effect at the Hememoglobin Beta Chain C Terminus Studied by Hydrogen Exchange," <i>J. Mol. Biol.</i> 201:765-772 (1988)		
	A30	MANDELL <i>et al.</i> , "Measurement of Amide Hydrogen Exchange by MALDI-TOF Mass Spectrometry," <i>Anal. Chem.</i> 70:3987-3995 (1998)		

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	A31	MAYNE <i>et al.</i> , "Effect of Antibody Binding on Protein Motions Studied by Hydrogen-Exchange Labeling and Two-Dimensional NMR," <i>Biochemistry</i> 31:10678-10685 (1992)		
	A32	MCCLOSKEY, "Introduction of Deuterium by Exchange for Measurement by Mass Spectrometry," <i>Meth. Enzymol.</i> 193:329-338 (1990)		
	A33	MOLDAY <i>et al.</i> , "Primary Structure Effects on Peptide Group Hydrogen Exchange," <i>Biochemistry</i> 11:150-158 (1972)		
	A34	PATERSON <i>et al.</i> "An Antibody Binding Site on Cytochrome c Defined by Hydrogen Exchange and Two-Dimensional NMR," <i>Science</i> 249:755-759 (1990)		
	A35	PEDERSEN <i>et al.</i> , "A Nuclear Magnetic Resonance Study of the Hydrogen-Exchange Behavior of Lysozyme in Crystals and Solution," <i>J.Mol.Biol.</i> , 213:413-426 (1990)		
	A36	RESING and AHN, "Deuterium Exchange Mass Spectrometry as a Probe of Protein Kinase Activation. Analysis of Wild-Type and Constitutively Active Mutants of MAP Kinase Kinase-1," <i>Biochemistry</i> 37:463-475 (1998)		
	A37	RESING and AHN, "Protein Phosphorylation Analysis by Electrospray Ionization-Mass Spectrometry," <i>Meth. Enzymol.</i> 283:29-44 (1997)		

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	A38	RESING <i>et al.</i> , "Modeling Deuterium Exchange Behavior of ERK2 Using Pepsin Mapping to Probe Secondary Structure," <i>J. Am. Soc. Mass Spectrometry</i> 10:685-702 (1999)		
	A39	ROGERO <i>et al.</i> , "Individual Breathing Reactions Measured by Functional Labeling and Hydrogen Exchange Methods," <i>Meth. Enzymol.</i> 131:508-517 (1986)		
	A40	ROSA and RICHARDS <i>et al.</i> , "An Experimental Procedure for Increasing the Structural Resolution of Chemical Hydrogen-exchange Measurements on Proteins: Application to Ribonuclease S Peptide," <i>J. Mol. Biol.</i> 133:399-416 (1979)		
	A41	ROSA <i>et al.</i> , "Hydrogen Exchange from Identified Regions of the S-Protein Component of Ribonuclease as a Function of Temperature, pH, and the Binding of S-Peptide," <i>J. Mol. Biol.</i> 145:835-851 (1981)		
	A42	ROSA <i>et al.</i> , "Effects of Binding of S-Peptide and 2'-Cytidine Monophosphate on Hydrogen Exchange from the S-Protein Component of Ribonuclease," <i>J. Mol. Biol.</i> 160:517-530 (1982)		
	A43	SMITH <i>et al.</i> , "Probing the Non-covalent Structure of Proteins by Amide Hydrogen Exchange and Mass Spectrometry," <i>J. Mass Spectrometry</i> 32:135-146 (1997)		
	A44	THEVENON-EMERIC <i>et al.</i> , "Determination of Amide Hydrogen Exchange Rates in Peptides by Mass Spectrometry," <i>Anal. Chem.</i> 64:2456-2358 (1992)		

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				Application Number	10/688.193
				Filing Date	10/17/2003
				First Named Inventor	Virgil L. Woods, Jr.
				Group Art Unit	2857
				Examiner Name	Unknown
Sheet	7	of	7	Attorney Docket Number	041673-3202

NON PATENT LITERATURE DOCUMENTS				
Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.		T <sup>6</sup>
	A45	WANG, <i>et al.</i> , "Hydrogen Exchange-Mass Spectrometry," <i>Moll. Cell Proteom</i> , 1:132-138 (2002) (we have a copy in the file)		
	A46	WINGER <i>et al.</i> , "Probing Qualitative Conformation Differences of Multiply Protonated Gas-Phase Proteins via H/D Isotopic Exchange with D <sub>2</sub> O," <i>J. Am. Chem. Soc.</i> 114:5897-5989 (1992)		
	A47	WOODS and HAMURO, "High Resolution, High-Throughput Amide Deuterium Exchange-Mass Spectrometry (DXMS) Determination of Protein Binding Site Structure and Dynamics: Utility in Pharmaceutical Design," <i>J. Cell. Biochem.</i> , 37:89-98 (2001)		
	A48	ZAWADZKI <i>et al.</i> , "Dissecting Interdomain Communication Within cAPK Regulatory Subunit Type II $\beta$ Using Enhanced Amide Hydrogen/Deuterium Exchange Mass Spectrometry," <i>Protein Sci.</i> 12:1980-1990 (2003)		
	A49	ZHANG and SMITH, "Determination of Amide Hydrogen Exchange b Mass Spectrometry: A New Tool for Protein Structure Elucidation," <i>Prot. Sci.</i> 2:522-531 (1993)		

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